thorium dioxide

Other names: thorium(IV) oxide
Inchi: InChI=1S/2O.Th
InchiKey: ZCUFMDLYAMJYST-UHFFFAOYSA-N
Formula: O2Th
SMILES: O=[Th]=O
Mol. weight [g/mol]: 264.04
CAS: 1314-20-1

Physical Properties

Property code	Value	Unit	Source
hfs	-1226.40 ± 3.50	kJ/mol	NIST Webbook
ie	8.70 ± 0.15	eV	NIST Webbook
ie	8.00 ± 1.00	eV	NIST Webbook
ie	8.70 ± 0.15	eV	NIST Webbook
ie	10.90	eV	NIST Webbook
ss	65.23 ± 0.20	J/mol×K	NIST Webbook

Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
cps	62.10	J/mol×K	300.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	61.80	J/mol×K	310.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method

cps	62.80	J/mol×K	320.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	63.50	J/mol×K	330.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	64.20	J/mol×K	340.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	65.10	J/mol×K	350.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	65.60	J/mol×K	360.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	65.90	J/mol×K	370.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	66.80	J/mol×K	380.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	

cps	67.30	J/mol×K	390.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	67.70	J/mol×K	400.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	68.00	J/mol×K	410.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	68.40	J/mol×K	420.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	68.60	J/mol×K	430.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	68.90	J/mol×K	440.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	69.60	J/mol×K	450.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method

cps	69.80	J/mol×K	460.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	70.10	J/mol×K	470.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	70.20	J/mol×K	480.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	70.50	J/mol×K	490.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	70.70	J/mol×K	500.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	70.90	J/mol×K	510.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	71.20	J/mol×K	520.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method

cps	71.40	J/mol×K	530.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	71.70	J/mol×K	540.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	71.90	J/mol×K	550.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	72.00	J/mol×K	560.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	72.10	J/mol×K	570.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	72.30	J/mol×K	580.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	72.50	J/mol×K	590.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method

cps	72.50	J/mol×K	600.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	72.50	J/mol×K	610.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	73.00	J/mol×K	620.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	73.00	J/mol×K	630.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	73.30	J/mol×K	640.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	73.60	J/mol×K	650.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	73.50	J/mol×K	660.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method

cps	73.60	J/mol×K	670.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	73.60	J/mol×K	680.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	73.40	J/mol×K	690.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	73.80	J/mol×K	700.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	74.50	J/mol×K	710.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	74.50	J/mol×K	720.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	74.60	J/mol×K	730.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method

cps	74.70	J/mol×K	739.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	74.60	J/mol×K	750.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	75.00	J/mol×K	760.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	75.30	J/mol×K	770.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	75.30	J/mol×K	780.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	75.30	J/mol×K	790.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	
cps	75.70	J/mol×K	800.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method	

cps	75.70	J/mol×K	810.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	75.70	J/mol×K	820.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	75.90	J/mol×K	830.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	76.00	J/mol×K	840.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	76.10	J/mol×K	850.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	76.40	J/mol×K	860.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method
cps	76.10	J/mol×K	870.00	Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method

Sources

NIST Webbook:	http://webbook.nist.gov/cgi/cbook.cgi?ID=C1314201&Units=SI
High temperature phase transition of mixed (PuO_2 + ThO_2) investigated by laser melting:	https://www.doi.org/10.1016/j.jct.2014.10.006
Thermochemistry of UO_2 - ThO_2 and UO_2 - ZrO_2 fluorite solid solutions:	https://www.doi.org/10.1016/j.jct.2017.05.026
Oxidation and thermo physical studies of non-stoichiometric thorium uranium oxides prepared by gel combustion method:	https://www.doi.org/10.1016/j.tca.2017.04.014

Legend

cps:	Solid phase heat capacity
hfs:	Solid phase enthalpy of formation at standard conditions
ie:	Ionization energy
ss:	Solid phase molar entropy at standard conditions